

Catalogue of American Amphibians and Reptiles.

SEIDEL, MICHAEL E. 1978. *Kinosternon flavescens*.

***Kinosternon flavescens* (Agassiz)
Yellow mud turtle**

Platythya flavescens Agassiz, 1857:430. Type-locality, "Texas, near San Antonio; . . . lower Rio Grande; . . . Red River, Arkansas; . . . Camp Yuma; . . . Gila River;" incorrectly restricted by Smith and Taylor (1950:24) to Waco, McLennan Co., Texas (Maslin, 1959:22). Syntypes: adult male and female, respectively, U.S. Nat. Mus. 50, 131823 (formerly 7867), Rio Blanco, Texas, by C. B. R. Kennerly, no date; adult male, USNM 7892, Camp Yuma, Gila R. by R. O. Abbott, no date; adult female, Mus. Comp. Zool., Harvard Univ., 1918, Rio Grande, Texas, by Capt. Marcy, no date; juvenile, MCZ 1919, Red River, Arkansas, by Capt. Marcy, no date (not seen by author).

Cinosternum flavescens: Agassiz, 1857:Pl. V. See COMMENT.

Kinosternum flavescens: Cope, 1892:333.

Kinosternon flavescens: Stone, 1903:540. First use of this combination.

• **CONTENT.** Three subspecies are recognized: *Kinosternon flavescens flavescens*, *K. f. stegnegeri* and *K. f. spooneri*. See COMMENT.

• **DEFINITION.** A kinosternid turtle with olive or gray skin and yellow markings on chin and throat. A faint yellow stripe is sometimes present on the sides of head and neck. Carapace of adults is 100–165 mm in length, with smooth (not keeled or rugose) grayish olive or brown scutes and dark borders. Ninth and tenth marginal scutes are higher than the eighth and eleventh, and occasionally flared. The wider, slightly unicarinate carapace of juveniles has scutes with dark posterior spots and only the dorsal peak of the ninth marginal extends above adjacent marginals. The plastron is yellow to brown and has two well-developed transverse hinges bordering the abdominal scutes anteriorly and posteriorly. The anterior lobe has nearly triangular pectorals (narrowly in contact) and the gulars extend as far forward as the carapace. Axillary and inguinal scutes are usually in contact, and the bridge is grooved posteriorly. Adult males have slightly concave plastrons; long, thick, spine-tipped tails; and patches of scales on the thigh and crus of each hind leg. Females have short stubby tails, flat plastrons, and shorter carapaces. In both sexes, all four feet are webbed.

• **DESCRIPTIONS.** General descriptions are given by Boulenger (1889), Brown (1903), Ellis and Henderson (1913), Van Denburgh (1922), Cahn (1937), Pope (1939), Carr (1952), Stebbins (1966), Cochran and Goin (1970), Ernst and Barbour (1972), and Conant (1975). Detailed anatomical studies describe the skull (Agassiz, 1857), skeleton (White, 1929), cervical vertebrae (Williams, 1950), adrenal gland (Hebard and Charipper, 1955), cloaca (Smith and James, 1958), plastral hinges (Shah, 1960), carapacial seam arrangements (Tinkle, 1962), penial morphology (Zug, 1966), choanal structure (Parsons, 1968), ear (Baird, 1970), pelvic girdle and limbs (Zug, 1971), carapace height/width (Patterson, 1973), musk glands (Waagen, 1972), and rostral pores (Winokur and Legler, 1974).

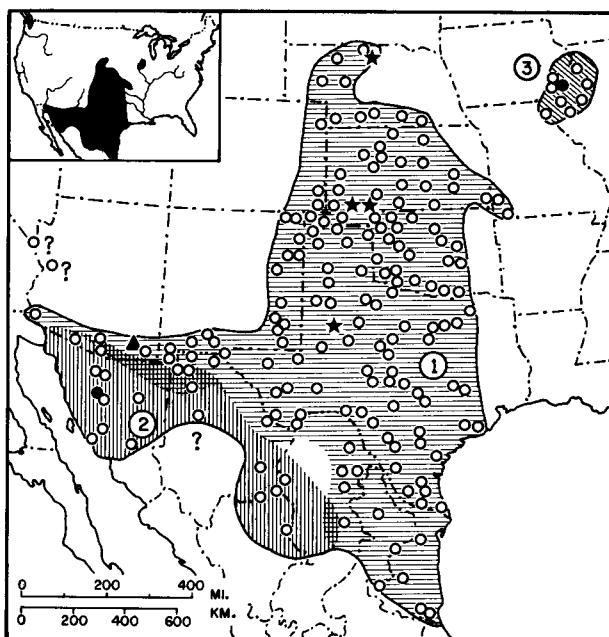
• **ILLUSTRATIONS.** Color photographs are presented by Pritchard (1967) and Ernst and Barbour (1972). Black and white photographs are found in Ditmars (1931), Cahn (1931, 1937), Hudson (1942), Rodeck (1950), P. W. Smith (1951), Carr (1952), Parmalee (1955), H. M. Smith (1956), Anderson (1965), Keasey (1971), Murphy (1973), Conant (1975), and Lardie (1975a). A black and white photograph of eggs appears in Ditmars (1936) and hatchling in Conant and Berry (1978). For drawings see Agassiz (1857), Coues (1875), and Wermuth and Mertens (1961). Illustrations of the skull are presented in Siebenrock (1907), Feuer (1970), and Ernst and Barbour (1972). Illustrations of the carapace are in Cagle (1941), and Blair et al. (1968). Illustrations of the head are in Stebbins (1954).

• **DISTRIBUTION.** The range of the yellow mud turtle centers in Kansas, Oklahoma, Texas, and northern Mexico. The southern edge extends diagonally from southern Sonora to southern Ta-

maulipas. The northern border extends eastward from southwestern Arizona through eastern New Mexico (elevations below 1,525 m; Degenhardt and Christiansen, 1974) and Colorado, northern Nebraska and southwestern Missouri. Relictual populations survive in the prairie area of Illinois (Moll and Brown, 1976) and adjacent Iowa and Missouri (Dodge and Miller, 1955; Dodge, 1956; Anderson, 1957; P. W. Smith, 1961). Additional distributional data are available for the following: Arizona (Lowe, 1967), Colorado (Ellis and Henderson, 1913; Maslin, 1950), Illinois (Cahn, 1931, 1937; Stejneger and Barbour, 1939; P. W. Smith, 1948), Kansas (Burt and Hoyle, 1934; Burt, 1935; H. M. Smith, 1956; Collins, 1974), Missouri (Anderson, 1965; D. D. Smith, 1974), Nebraska (Hudson, 1942; Imler, 1945), New Mexico (Bundy, 1951), Oklahoma (Ortenburger, 1927; Ortenburger and Freeman, 1930; H. M. Smith and Leonard, 1934; A. Blair, 1950; Dundee, 1950; Carpenter, 1955a, 1956; Carter and Cox, 1968; Webb, 1970), Texas (Cope, 1888, 1892, 1893; Strecker, 1931; Marr, 1944; Schmidt and Smith, 1944; Jameson and Flury, 1949; W. Blair, 1950; Brown, 1950; Peterson, 1950; Fouquette and Lindsay, 1955; Axtell, 1959; Raun, 1959; Raun and Gehlbach, 1972; Lewis, 1974; Easterla, 1975; Hambrick, 1975; Cys, 1976), Mexico (Allen, 1933; Hartweg, 1938; Bogert and Oliver, 1945; Langebartel and Smith, 1954; Chrapliwy and Fugler, 1955; Williams, 1961; Liner et al., 1976; Seidel, 1976). Questionable records exist from Clark County, Nevada (La Rivers, 1942) and northwestern Arizona (Stebbins, 1966). The range was erroneously believed to include southeastern California (Stebbins, 1972), southern Utah (Tanner, 1928, 1929; Pope, 1939; Carr, 1952), eastern Oklahoma (Force, 1925, 1930), and northern Sinaloa, Mexico (Conant, 1975; Conant and Berry, 1978).

• **FOSSIL RECORD.** Fossil *Kinosternon flavescens* have been found in Saw Rock Canyon local fauna, Early Pliocene (Hemphillian) of Seward County, Kansas; Rexroad local fauna, Pliocene (Blancan) of Cottrell locality, Meade County, Kansas; Sand Draw local fauna, Early Pleistocene (Aftonian) of Brown County, Nebraska (Fichter, 1969); and Beck Ranch local fauna, Upper Pliocene (Blancan) of Scurry County, Texas (Rogers, 1976). *Kinosternon arizonense*, a Pliocene fossil from Cochise County, Arizona, apparently has a close affinity with extant *Kinosternon flavescens* (Gilmore, 1923).

• **PERTINENT LITERATURE.** The general biology of *K. flavescens* is presented by Pope (1939), Carr (1952), P. W. Smith (1961),



MAP. Solid circles mark type localities, open circles indicate other records; areas of probable intergradation are indicated by overlapping lines. Stars mark fossil localities, triangle marks locality for fossil species *Kinosternon arizonense*.

Mahmoud (1969), and Ernst and Barbour (1972). Other important references are listed by topic. Habitat, predators and sympatric species: Strecker (1931), Jameson and Flury (1949), Carpenter (1955b, 1957), Olson (1959), Platt (1969), Leviton (1972), Degenhardt and Christiansen (1974), Cooper (1975, 1977), Seidel (1976). Growth: Wunder et al. (1962), Wunder (1965), Mahmoud (1969). Feeding behavior: Strecker (1927), Minton (1959), Mahmoud (1968, 1969), Punzo (1974). Habits in captivity: Rust (1936), Anderson (1965), Keasey (1971). Algal relationships: Proctor (1958), Dixon (1960). Reproduction: Taylor (1933), Mahmoud (1967), Christiansen and Dunham (1972), Mahmoud and Klicka (1972), Lardie (1975a, 1975b), Iverson (1975). Karyotype: Stock (1972), Killebrew (1975). Physiology: Seidel (in press). Blood chemistry: Frair (1964, 1972), Sullivan and Riggs (1967a-c), Reite (1973), Punzo (1976), Chilian (1976). Righting reflex: Ashe (1970). Geographical variation: Van Denburgh (1922), H. M. Smith and Sanders (1952), P. W. Smith and Hensley (1957), Williams (1961). Zoogeography: H. M. Smith and Buechner (1947), P. W. Smith and Minton (1957), Auffenberg and Milstead (1965), Morafka (1977).

• **ETYMOLOGY.** The specific name *flavescens* (Latin, *flavescere* "gold colored") refers to the yellow color often present on the underside of jaw and throat. The subspecific name *stejnegeri* honors Leonhard Stejneger, noted taxonomist and former curator of herpetology at the United States National Museum. The subspecific name *spooneri* honors Charles S. Spooner, former chairman of zoology at Eastern Illinois State College.

1. *Kinosternon flavescens flavescens* (Agassiz)

Platythyra flavescens Agassiz, 1857:430. See species account.
Kinosternon flavescens flavescens: Hartweg, 1938:2. Recognition of subspecies.

• **DEFINITION.** The skin is gray or grayish olive except for the bright yellow on the underside of jaw and throat. Mottling is only evident on the head of old individuals. The carapace is uniform olive with a small cervical scute. The gular is also small, 41% (range 27–50%) the length of the anterior lobe of plastron (Hartweg, 1938).

2. *Kinosternon flavescens stejnegeri* Hartweg

Kinosternon flavescens stejnegeri Hartweg, 1938:1. Type-locality, "Llano, Sonora" (midway between Nogales and Hermosillo, Mexico). Holotype, adult male, Univ. Michigan Mus. Zool. 72235, collected by Morrow J. Allen, July 3, 1932 (examined by author). See COMMENT.

• **DEFINITION.** The skin of jaws, throat, and sides of the head is yellow, all other areas gray. The carapace is brownish olive. The cervical scute, gular scute, and interfemoral seam are large. The gular (28 mm long in two adults reported by Smith and Hensley, 1957) is approximately 63% (range 60–64%) the length of the anterior lobe of plastron (Hartweg, 1938).

3. *Kinosternon flavescens spooneri* Smith

Kinosternon flavescens spooneri Smith, 1951:195. Type-locality, "Henderson County State Forest, 7 miles north of Oquawka, Henderson Co. Illinois." Holotype, adult female, Illinois Natur. Hist. Mus. 4244, collected by P. W. Smith, June 9, 1949 (not seen by author).

• **DEFINITION.** The skin and carapace are dark brown or olive. Yellow pigment is restricted to barbels and front half of the lower jaw. Juveniles are very dark with irregular light markings on the chin which may persist in the adults. The gular scute is approximately 51% (range 43–56%) the length of the anterior lobe of plastron (P. W. Smith, 1951).

COMMENT

Agassiz (1857) described the yellow mud turtle in the genus *Platythyra* but in a figure caption later in the same work (1857, pl. 5) transferred it to the genus *Cinosternum*. The turtles Agassiz (1857:430) cites from the Red River, Arkansas, are presumably *Kinosternon subrubrum hippocrepis* and perhaps for this reason Gray (1870) synonymized *flavescens* with *hippocrepis*.

Range limits for *K. f. stejnegeri* are poorly defined due to extensive zones of intergradation with *K. f. flavescens* and weak

characterization of the subspecies (Gehlbach and Iverson, personal communication).

An apparent error exists in Hartweg's (1938) description of *K. f. stejnegeri*. In the far right column of Table I, p. 4 (Anterior lobe length/gular length + nuchal width + femoral seam length) either the heading or ratios are reversed.

Two manuscripts by John B. Iverson (both accepted for publication in Copeia) reevaluate the subspecies of *K. flavescens*.

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